OIPE
AUG 03 2006
PATENT & TRADEMARK OFFICE

FIG.1

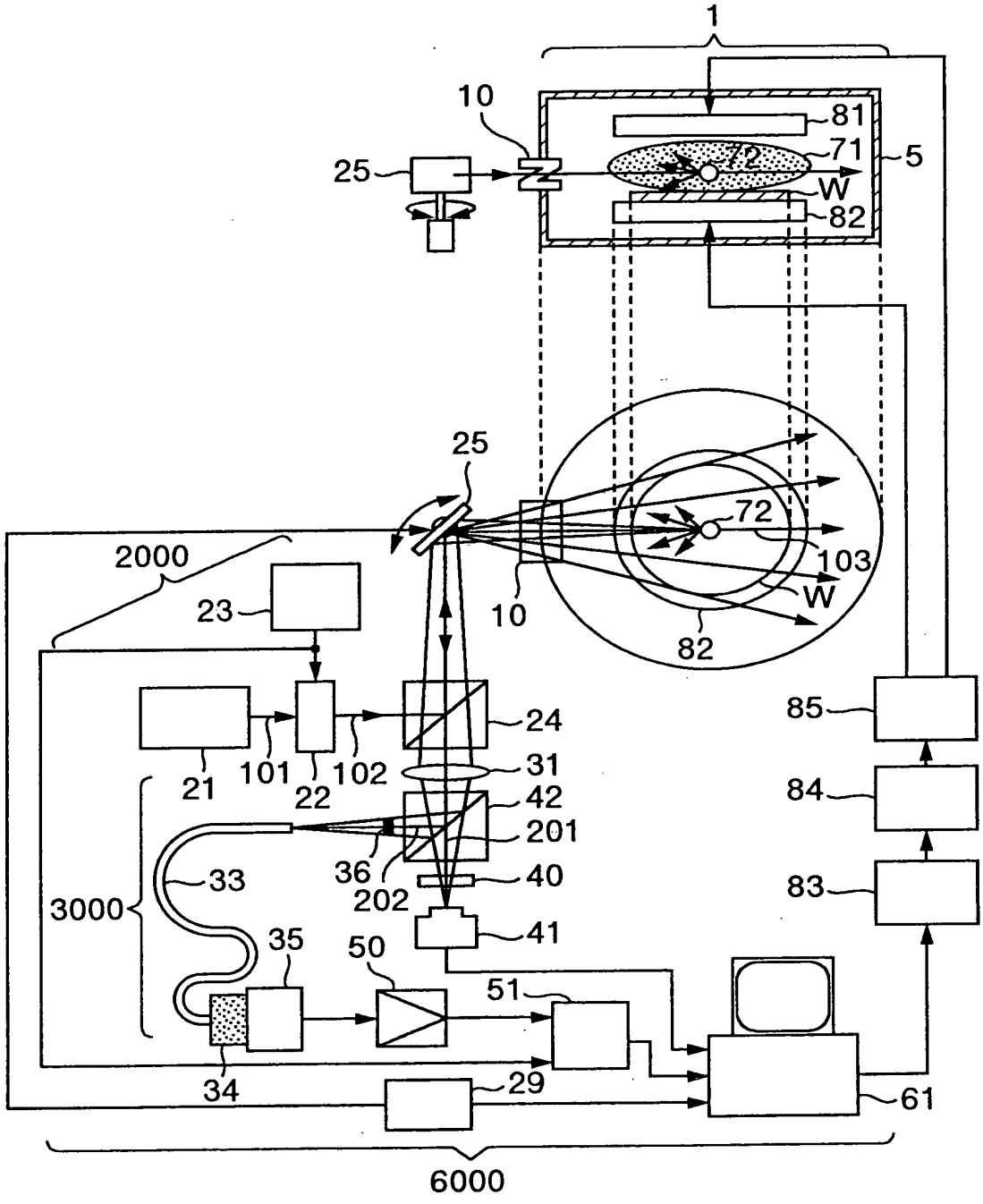
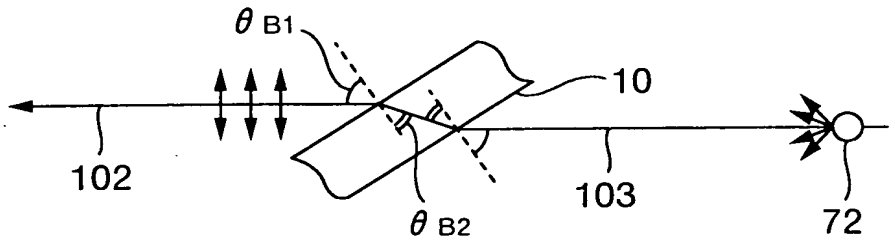


FIG.2

(a)



(b)

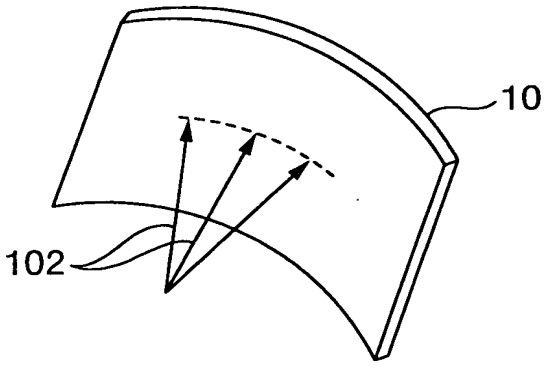
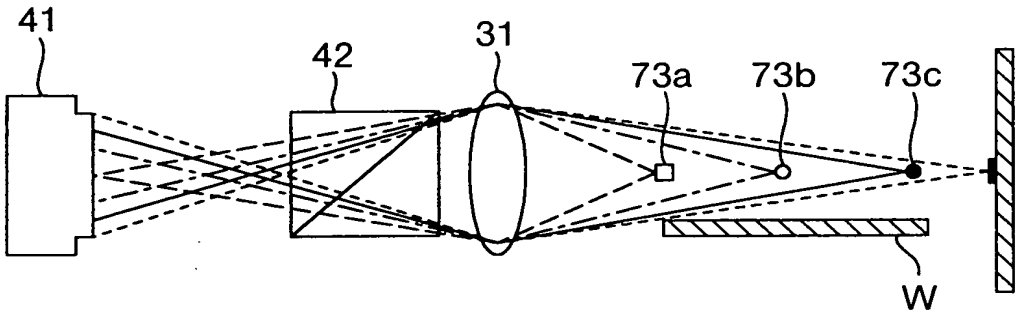


FIG.3

(a)



(b)

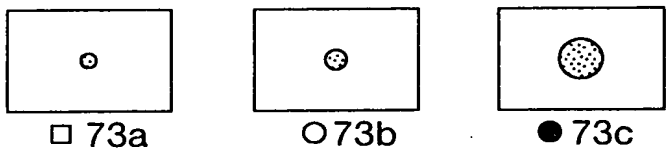


FIG.4

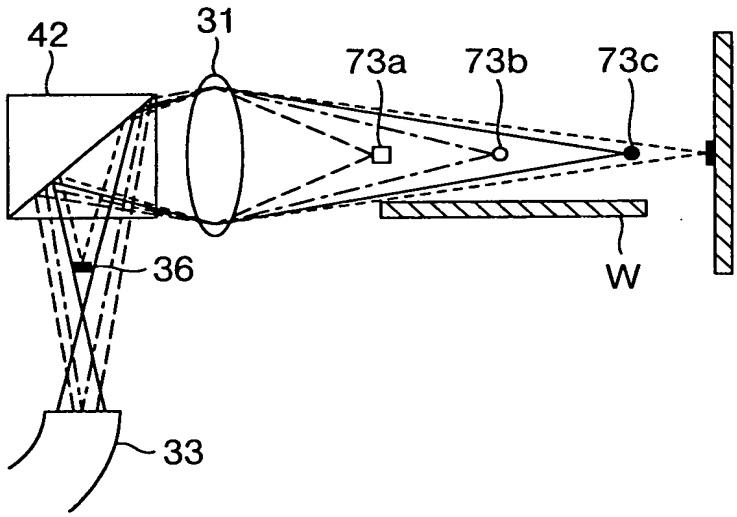


FIG.5

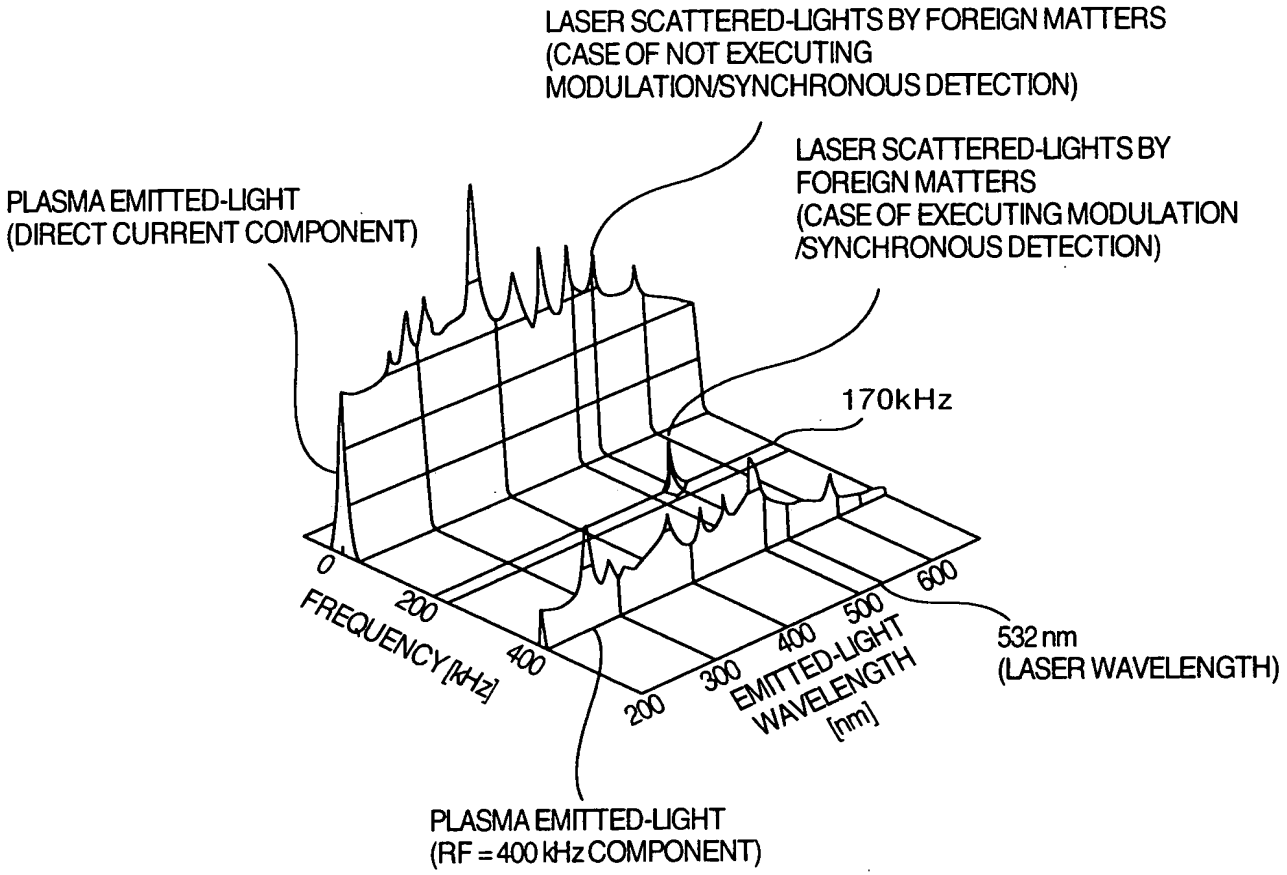

LASER SCATTERED-LIGHTS BY FOREIGN MATTERS
(CASE OF NOT EXECUTING
MODULATION/SYNCHRONOUS DETECTION)
LASER SCATTERED-LIGHTS BY
FOREIGN MATTERS
(CASE OF EXECUTING MODULATION
/SYNCHRONOUS DETECTION)
PLASMA EMITTED-LIGHT
(DIRECT CURRENT COMPONENT)
170kHz
0
200
400
FREQUENCY [kHz]
200
300
400
500
600
EMITTED-LIGHT
WAVELENGTH
[nm]
532 nm
(LASER WAVELENGTH)
PLASMA EMITTED-LIGHT
(RF = 400 kHz COMPONENT)

FIG.6

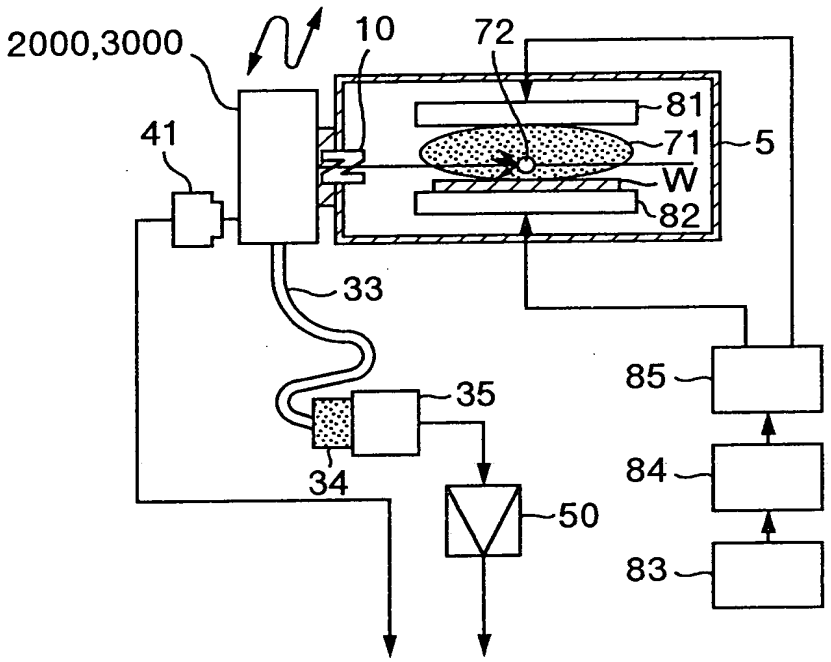


FIG.7

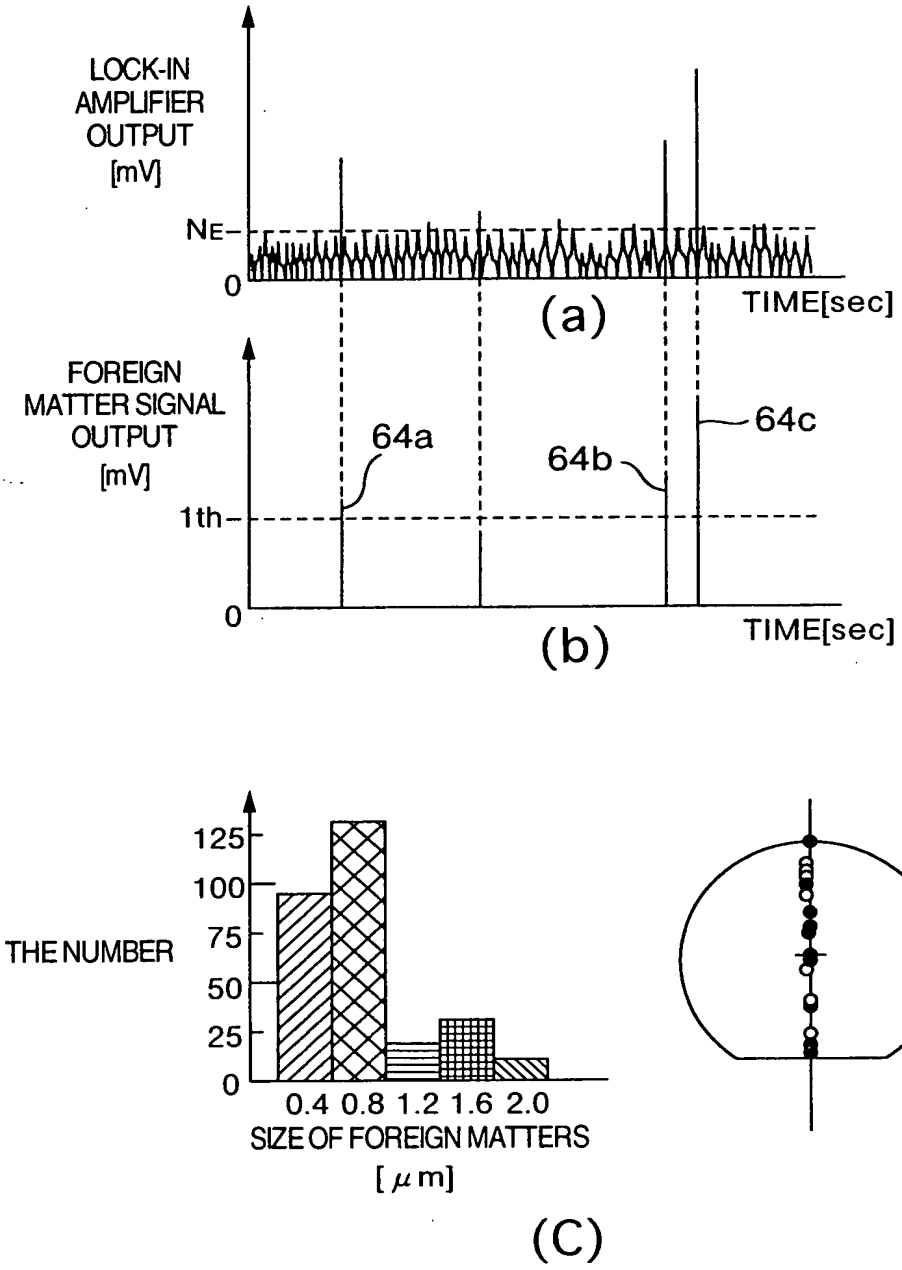
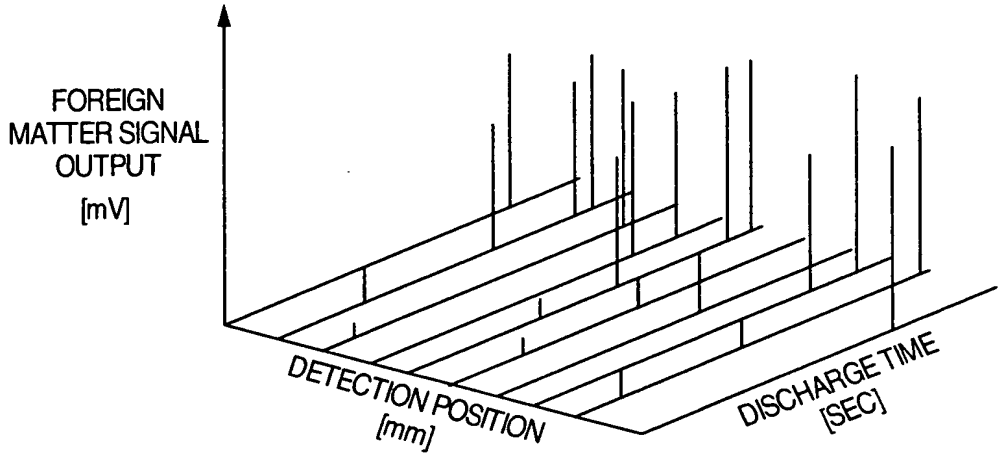

LOCK-IN
AMPLIFIER
OUTPUT
[mV]
NE
0
TIME[sec]
(a)
FOREIGN
MATTER SIGNAL
OUTPUT
[mV]
64a
64b
64c
1th
0
TIME[sec]
(b)
THE NUMBER
125
100
75
50
25
0
0.4 0.8 1.2 1.6 2.0
SIZE OF FOREIGN MATTERS
[μm]
(C)

FIG.8

(a)


FOREIGN
MATTER SIGNAL
OUTPUT
[mV]
DETECTION POSITION
[mm]
DISCHARGE TIME
[SEC]

(b)

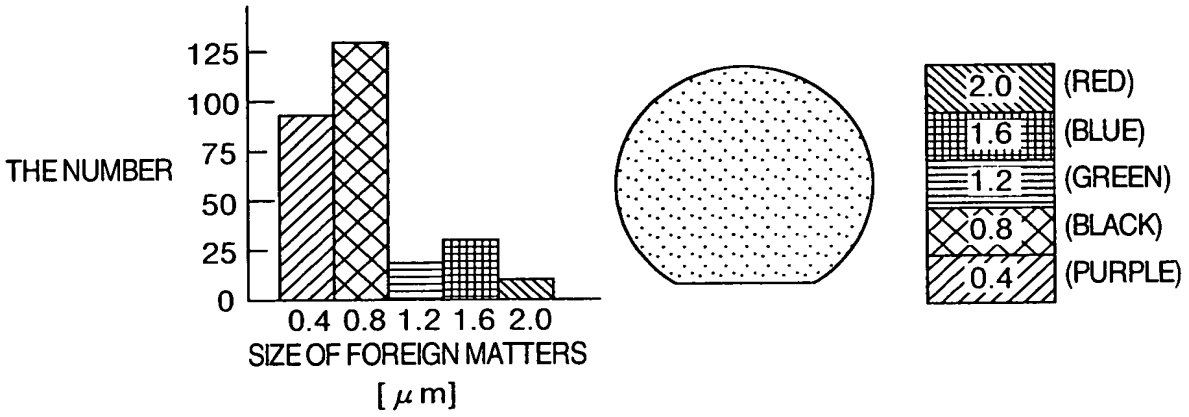

THE NUMBER
125
100
75
50
25
0
0.4 0.8 1.2 1.6 2.0
SIZE OF FOREIGN MATTERS
[μm]
2.0
(RED)
1.6
(BLUE)
1.2
(GREEN)
0.8
(BLACK)
0.4
(PURPLE)

FIG.9

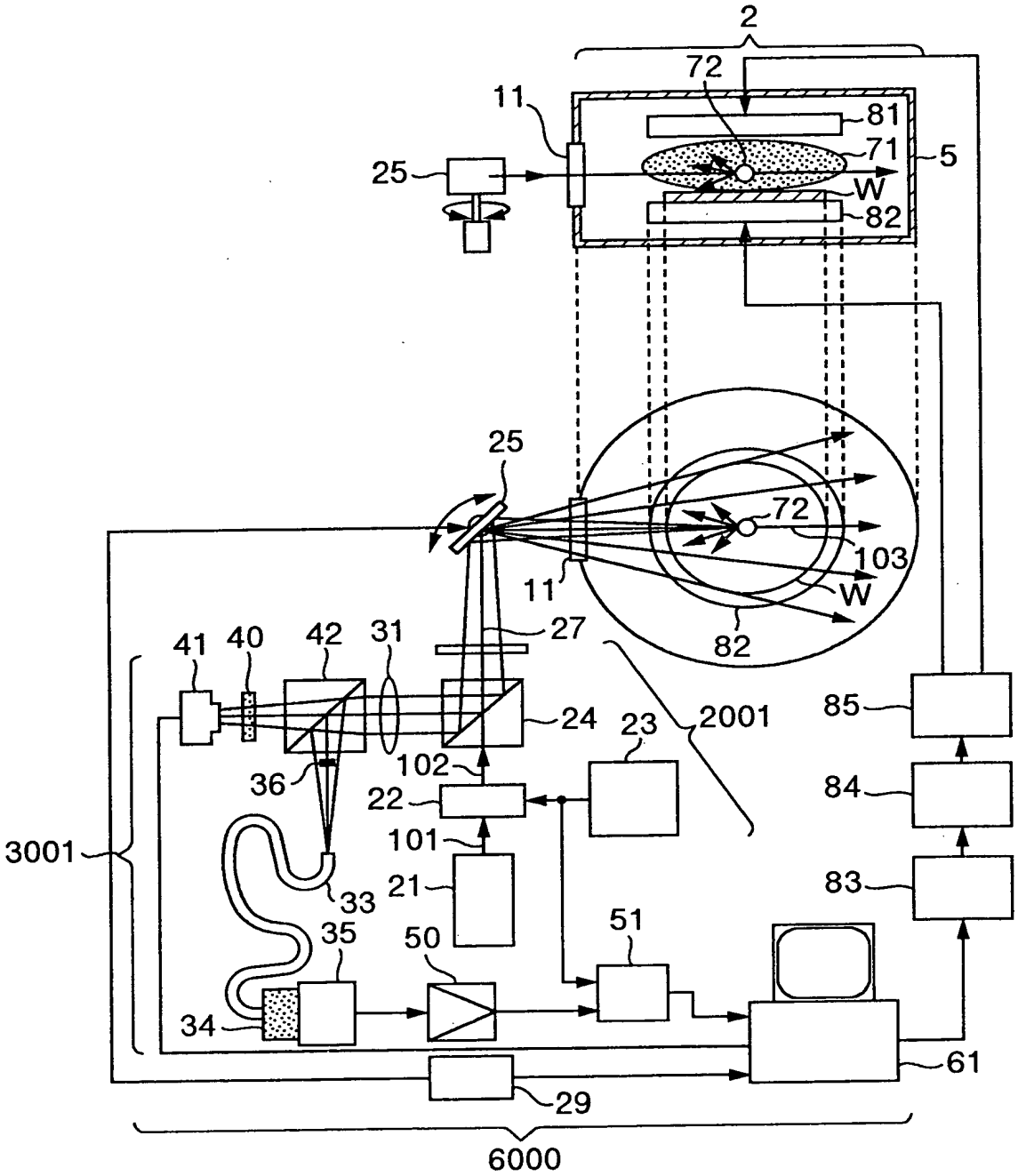

2
72
11
81
71
5
25
W
82
25
72
103
11
W
82
41
40
42
31
27
2001
85
24
23
102
36
22
84
3001
101
21
83
33
35
50
51
34
61
29
6000

FIG.10

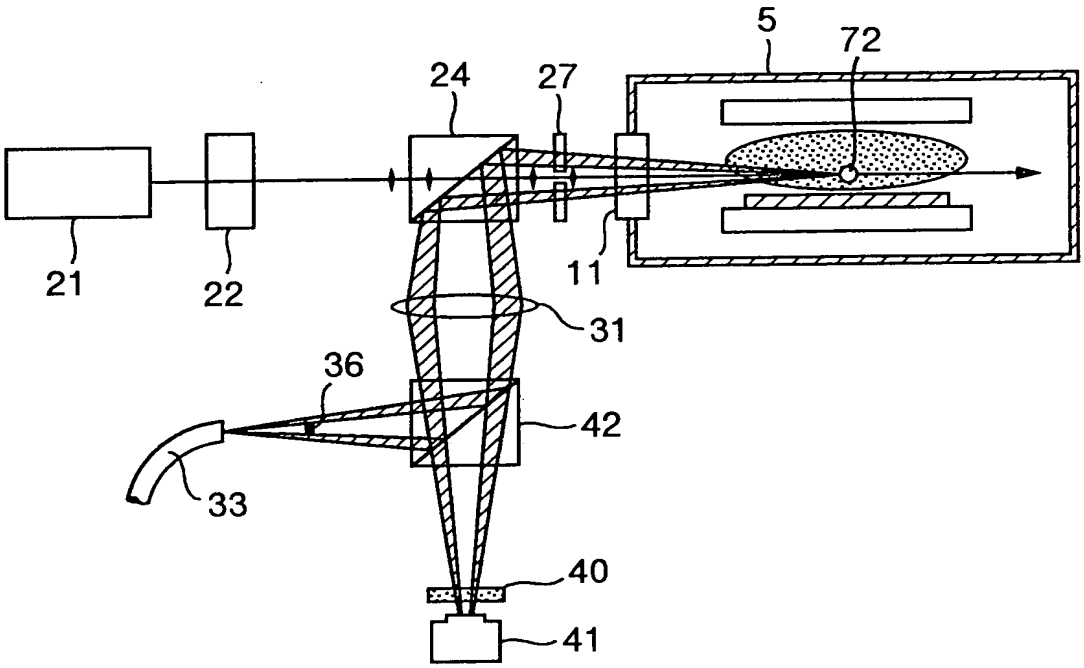


FIG.11

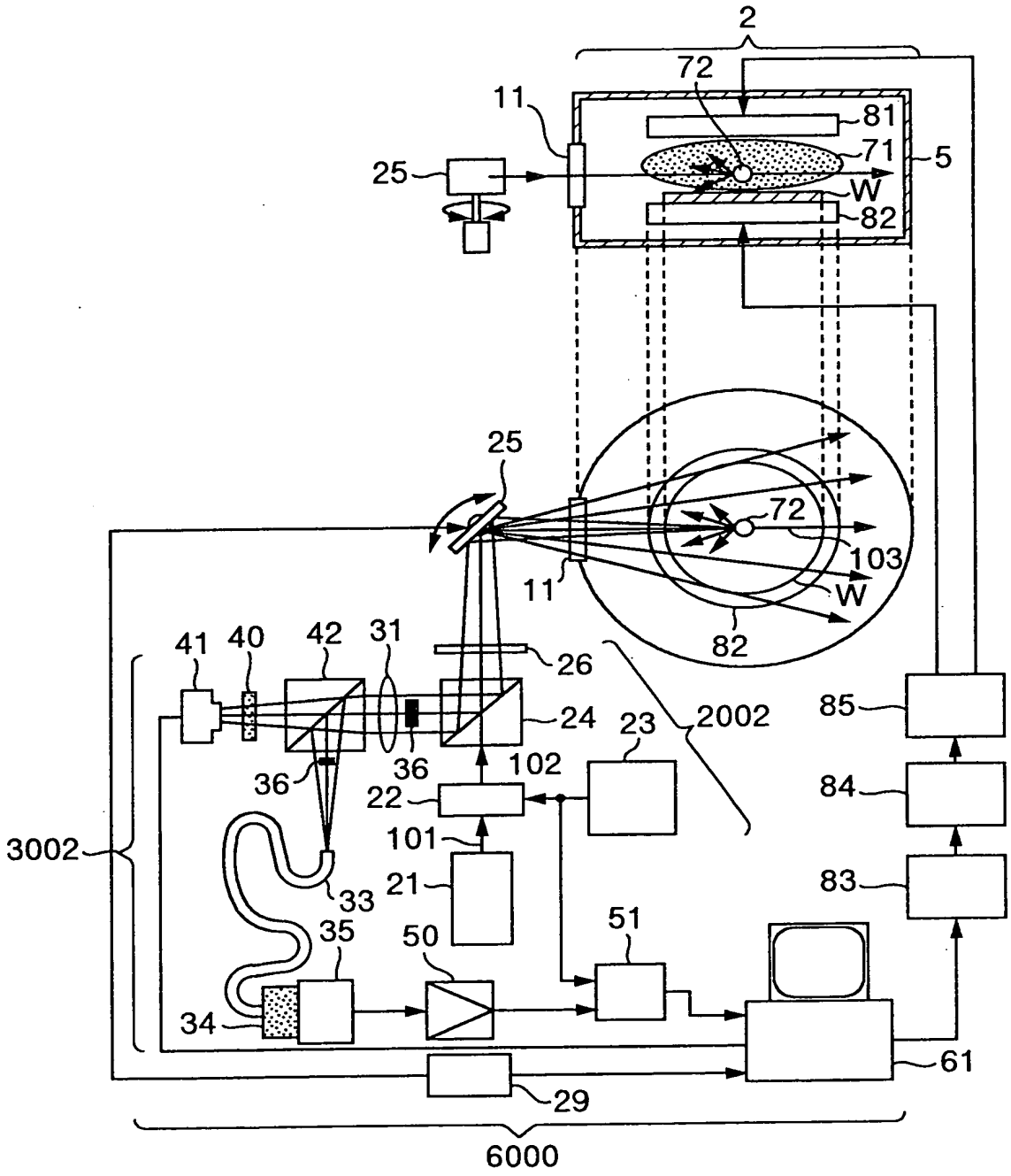

2
72
11
81
71
5
25
W
82
25
72
103
11
W
82
41
40
42
31
26
24
23
2002
85
36
36
102
22
84
101
3002
21
83
33
35
50
51
34
61
29
6000

FIG.12

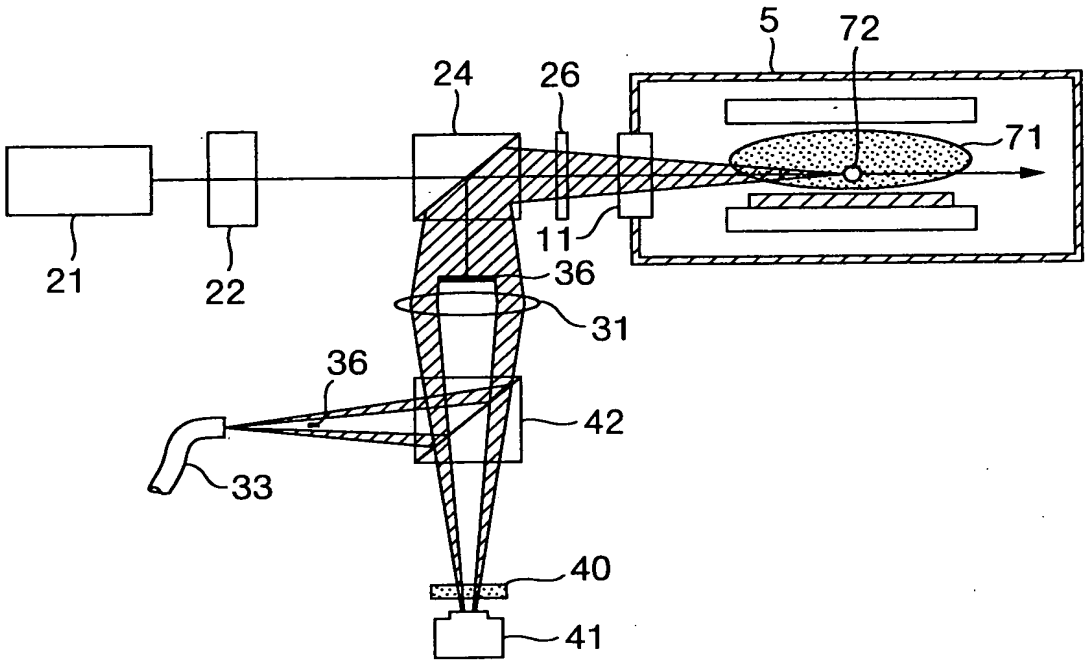


FIG.13

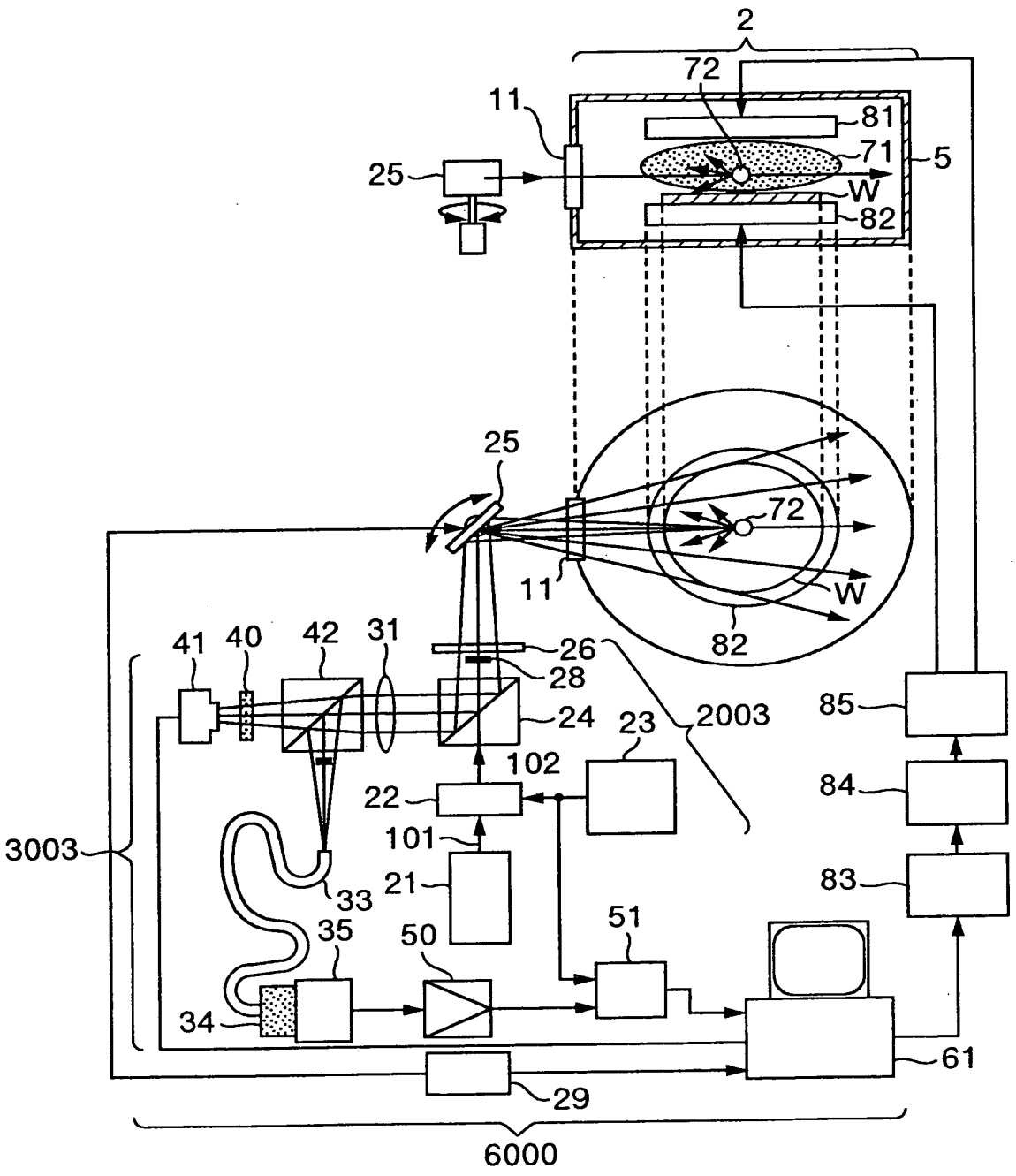

2
72
11
81
71
5
25
W
82
25
72
11
W
82
41
40
42
31
26
28
24
23
2003
85
102
22
84
3003
101
21
83
33
35
50
51
34
61
29
6000

FIG.14

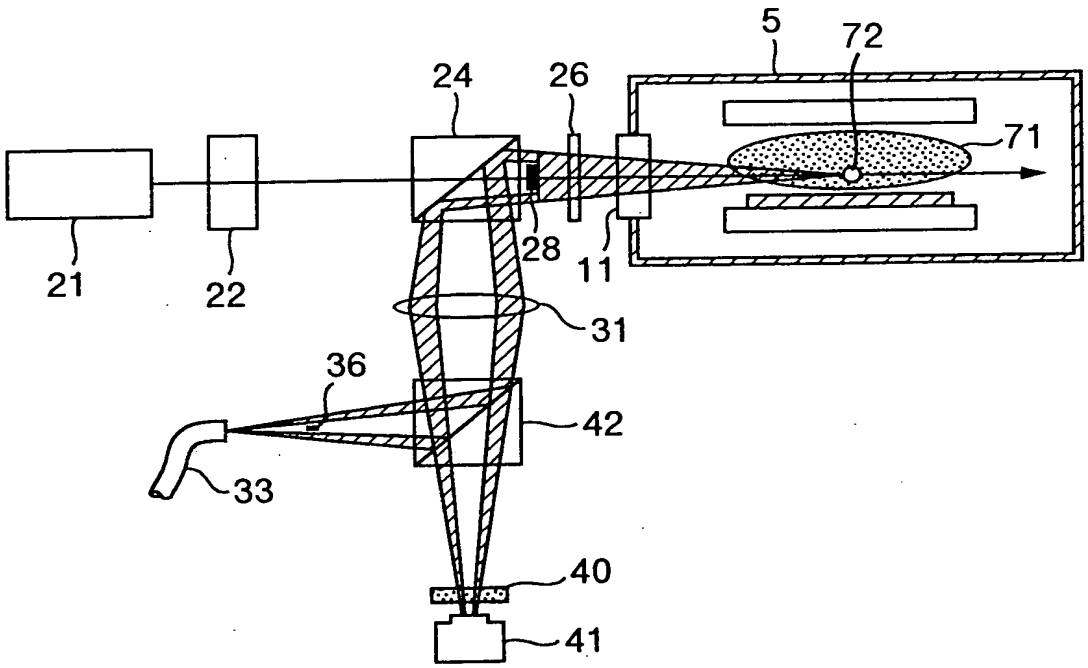


FIG.15

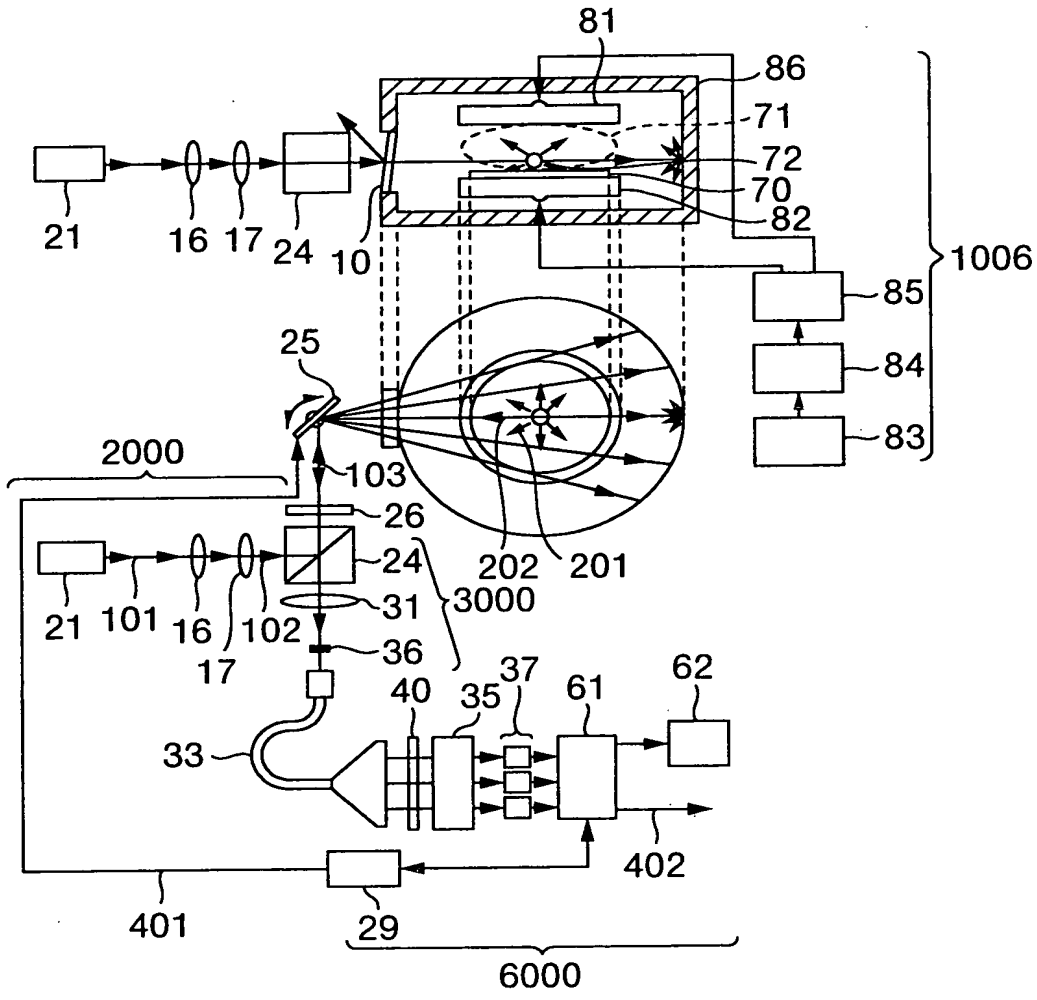

81
86
71
72
70
82
1006
85
84
83
21
16
17
24
10
25
2000
103
26
24
31
3000
21
101
16
102
17
36
202
201
33
40
35
37
61
62
402
401
29
6000

FIG.16

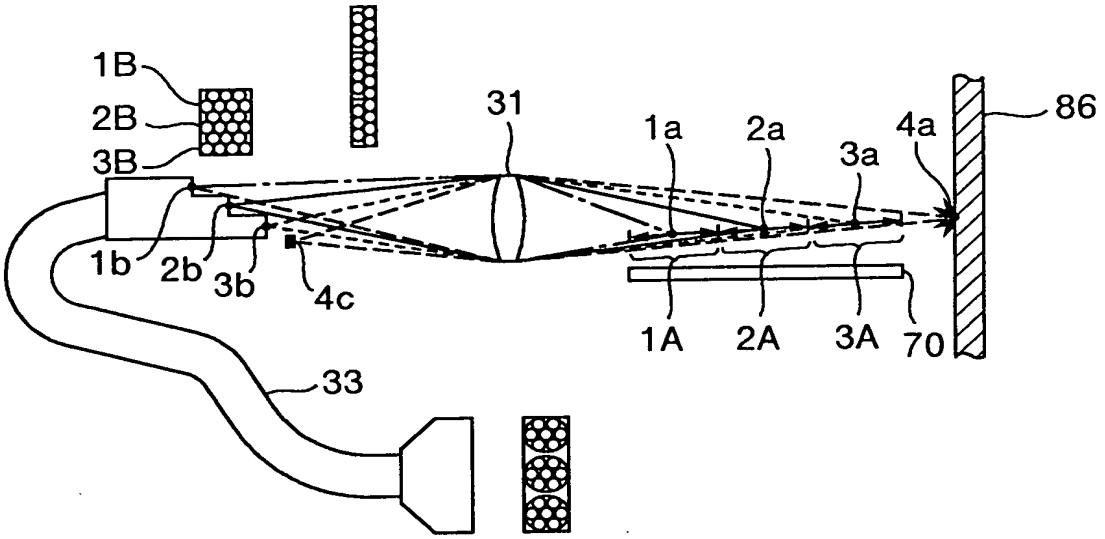


FIG.17

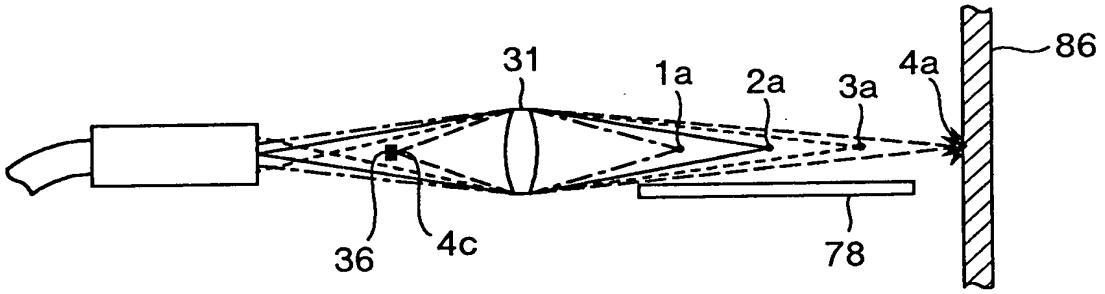


FIG.18

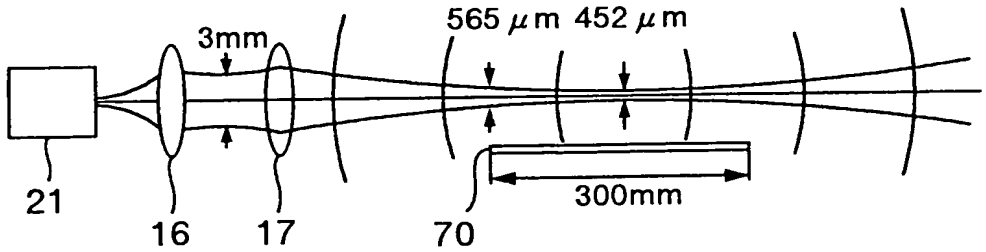


FIG.19

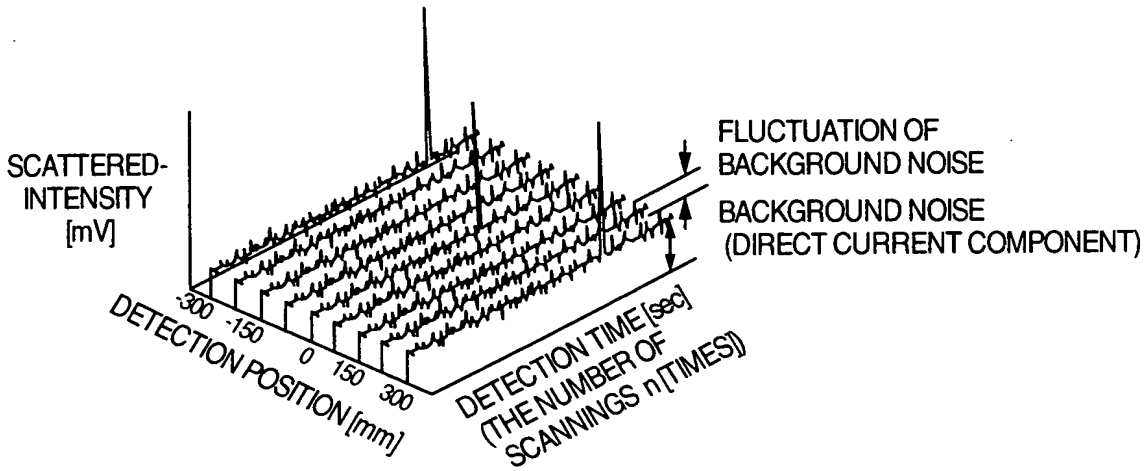

SCATTERED-
INTENSITY
[mV]
FLUCTUATION OF
BACKGROUND NOISE
BACKGROUND NOISE
(DIRECT CURRENT COMPONENT)
-300
-150
0
150
300
DETECTION POSITION [mm]
DETECTION TIME [sec]
(THE NUMBER OF
SCANNINGS n [TIMES])

FIG.20

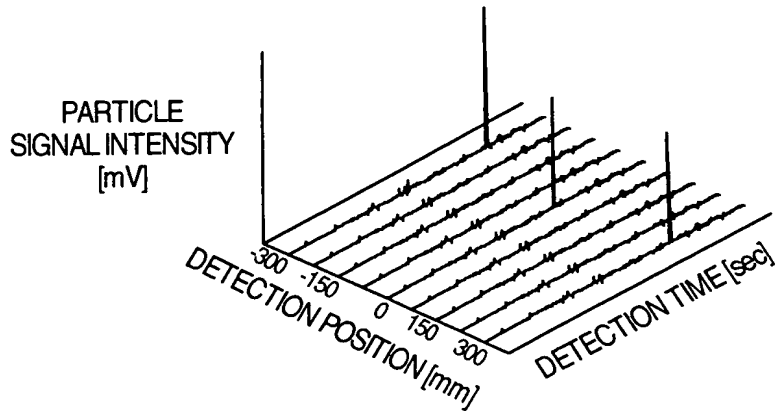

PARTICLE
SIGNAL INTENSITY
[mV]
-300
-150
0
150
300
DETECTION POSITION [mm]
DETECTION TIME [sec]

FIG.21

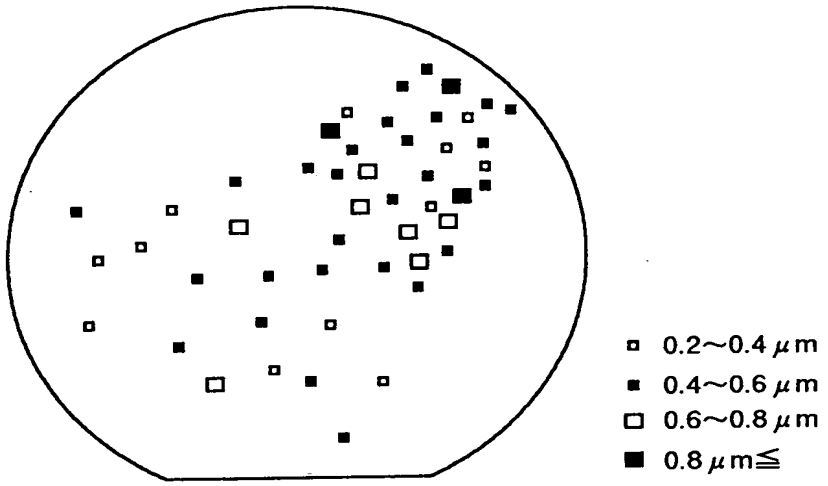


FIG.22

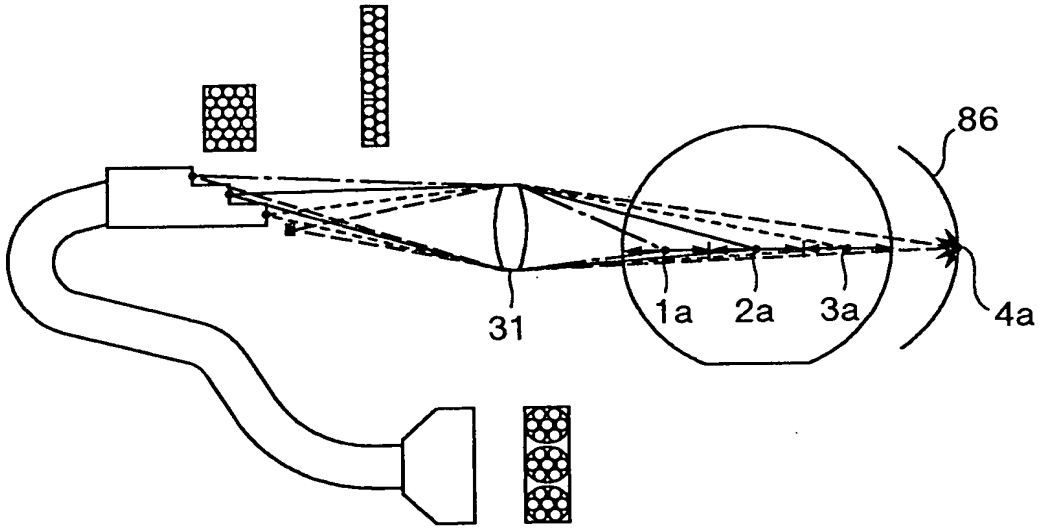


FIG.23

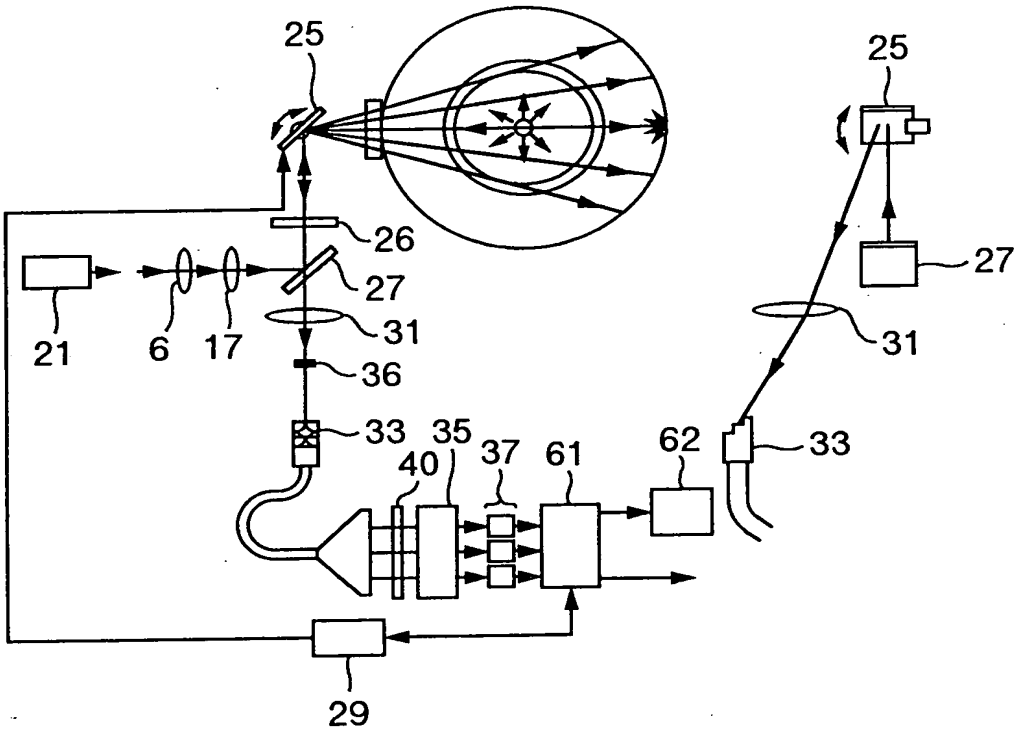


FIG.24

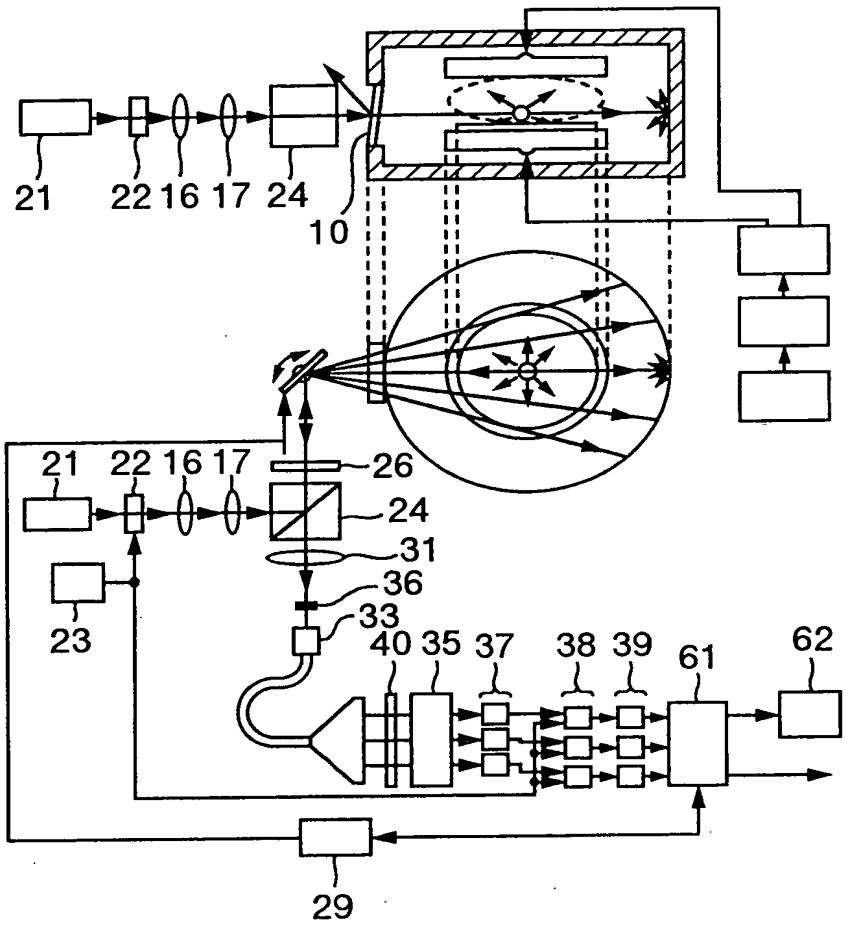
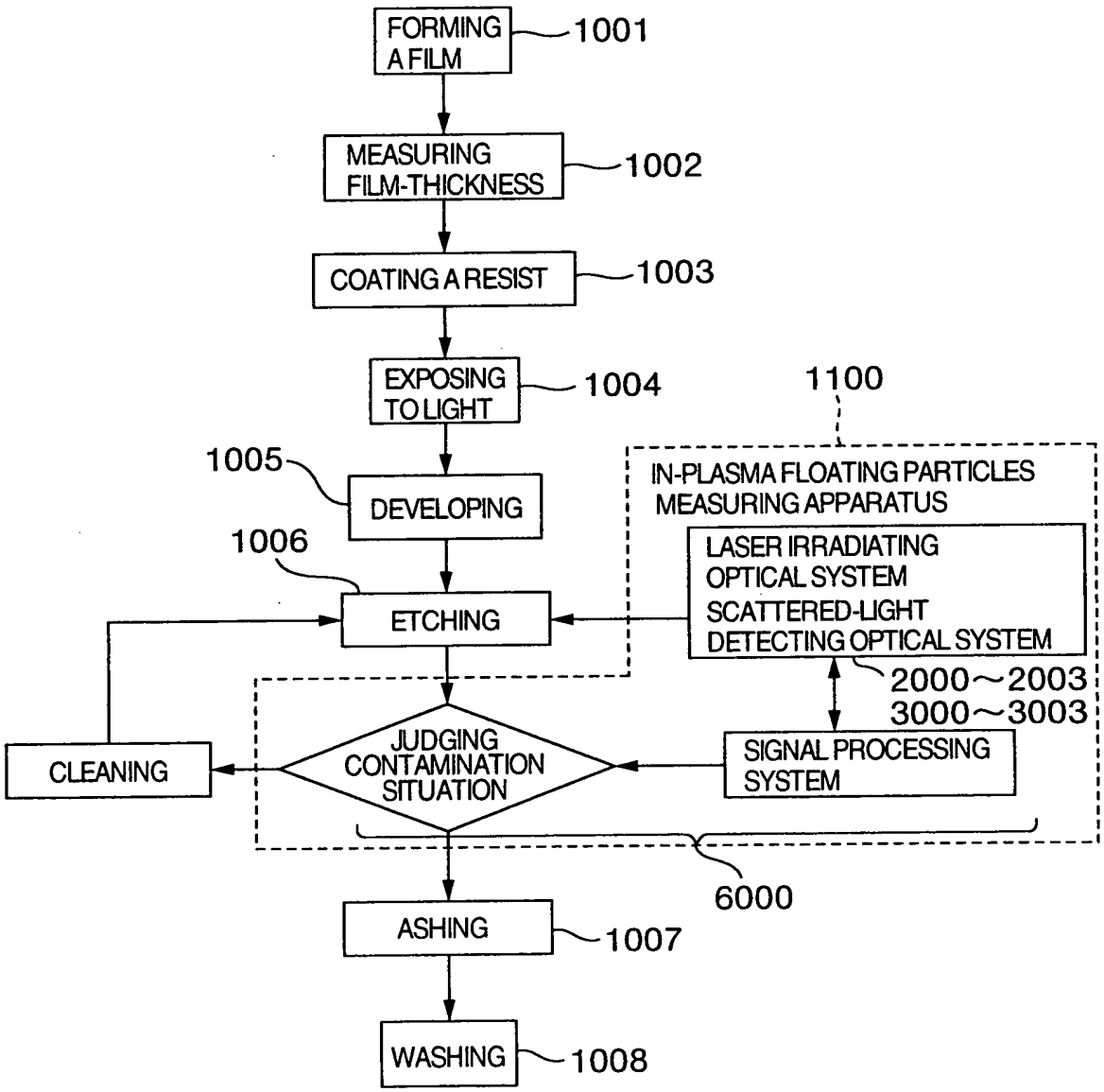


FIG.25


FORMING A FILM
1001
MEASURING FILM-THICKNESS
1002
COATING A RESIST
1003
EXPOSING TO LIGHT
1004
1100
1005
DEVELOPING
IN-PLASMA FLOATING PARTICLES MEASURING APPARATUS
1006
ETCHING
LASER IRRADIATING OPTICAL SYSTEM
SCATTERED-LIGHT DETECTING OPTICAL SYSTEM
2000~2003
3000~3003
CLEANING
JUDGING CONTAMINATION SITUATION
SIGNAL PROCESSING SYSTEM
6000
ASHING
1007
WASHING
1008

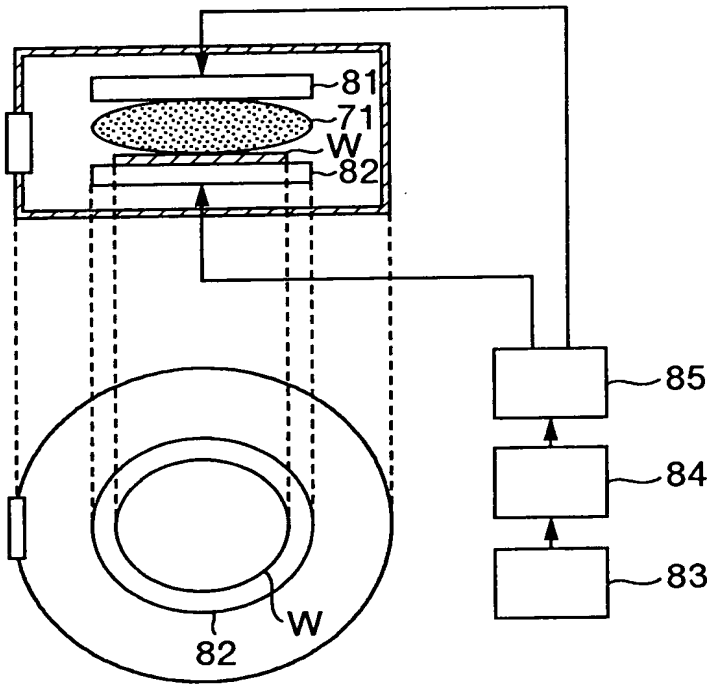



FIG.26